

November 5, 2002

File 344:Chinese Patents Abs Aug 1985-2002/Oct  
(c) 2002 European Patent Office  
File 347:JAPIO Oct 1976-2002/Jun(Updated 021004)  
(c) 2002 JPO & JAPIO  
File 350:Derwent WPIX 1963-2002/UD,UM &UP=200270  
(c) 2002 Thomson Derwent

Set	Items	Description
S1	894	PHASE(2N)CONJUGAT?
S2	3559145	PROBE? OR PROBING OR INTERROGAT? OR EXPLOR? OR INVESTIGAT? OR INSPECT? OR PENETRAT? OR PROD?
S3	955644	BEAM? OR LASER? OR LIGHT(2N)(PULS? OR MODULAT?) OR MASER? - OR QUANTUM(2N)ELECTRONIC? OR OPTICAL(2N)(PUMP? OR GENERAT? OR MODULAT? OR OSCILLATOR?) OR IRASER? OR QUANTUM()GENERATOR?
S4	606	INTRACAVIT? OR INTRA()CAVIT?
S5	209	S1 AND S2 AND S3
S6	19	S1 AND IC=H04B-010/00
S7	27542	S2(3N)S3
S8	2	S5 AND S4
S9	1	S8 NOT S6
S10	87	S7 AND S1
S11	25	S7(5N)S1
S12	25	S11 NOT (S9 OR S6)
S13	19	S7(3N)S1
S14	19	S13 NOT(S6 OR S9)

November 5, 2002

6/5/1 (Item 1 from file: 347)  
DIALOG(R)File 347:JAPIO  
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05053324 \*\*Image available\*\*  
IMAGE OPTICAL TRANSMISSION SYSTEM

PUB. NO.: 08-008824 [JP 8008824 A]  
PUBLISHED: January 12, 1996 (19960112)  
INVENTOR(s): KITAYAMA KENICHI  
APPLICANT(s): NIPPON TELEGR & TELEPH CORP <NTT> [000422] (A Japanese Company or Corporation), JP (Japan)  
APPL. NO.: 06-139065 [JP 94139065]  
FILED: June 21, 1994 (19940621)  
INTL CLASS: [6] H04B-010/02; H04B-010/18; G02F-001/35; **H04B-010/00**  
JAPIO CLASS: 44.2 (COMMUNICATION -- Transmission Systems); 29.2 (PRECISION INSTRUMENTS -- Optical Equipment)  
JAPIO KEYWORD:R002 (LASERS); R012 (OPTICAL FIBERS)

#### ABSTRACT

PURPOSE: To realize non-distortion image transmission employing a **phase conjugate** wave by using a non-degradate **phase conjugated** wave using mixture of four photons due to the nonlinear optical effect of an optical fiber so as to compensate image distortion.  
CONSTITUTION: A laser beam whose wavelength is  $\lambda$  is modulated by using information of an input image 11 at a transmitter side T and the modulated light is made incident onto a multi-mode fiber 16 via a lens. A **phase conjugate** wave generating section 18 provided between multi-mode fibers 16, 17 mixes the signal light whose wavelength is  $\lambda$  to be sent and a pump light 13 whose wavelength is  $\lambda_p$ , to generate a **phase conjugate** wave whose wavelength is  $\lambda'$ , then the pump light 13 and the sent light are eliminated and only the generated **phase conjugate** wave is made incident onto the multi-mode fiber 17 at the post stage, through which the light is sent up to a receiver side R. In this case, the frequency of the **phase conjugate** wave is not the same as that of the incident wave, and a relation of  $\Delta\omega = \omega - \omega_p - \omega_{p'}$  is in existence among the pump light frequency  $\omega_p$  and frequencies  $\omega$ ,  $\omega'$  of the signal light and the **phase conjugate** wave based on the conservation law of energy.

6/5/2 (Item 2 from file: 347)  
DIALOG(R)File 347:JAPIO  
(c) 2002 JPO & JAPIO. All rts. reserv.

04370424 \*\*Image available\*\*  
PICTURE TRANSMISSION SYSTEM

PUB. NO.: 06-014324 [JP 6014324 A]  
PUBLISHED: January 21, 1994 (19940121)  
INVENTOR(s): KITAYAMA KENICHI  
FUKUI MASAKI  
APPLICANT(s): NIPPON TELEGR & TELEPH CORP <NTT> [000422] (A Japanese Company or Corporation), JP (Japan)  
APPL. NO.: 04-166352 [JP 92166352]  
FILED: June 24, 1992 (19920624)  
INTL CLASS: [5] H04N-007/22; **H04B-010/00**  
JAPIO CLASS: 44.6 (COMMUNICATION -- Television); 44.2 (COMMUNICATION -- Transmission Systems)  
JAPIO KEYWORD:R012 (OPTICAL FIBERS)  
JOURNAL: Section: E, Section No. 1539, Vol. 18, No. 218, Pg. 102, April 19, 1994 (19940419)

#### ABSTRACT

November 5, 2002

PURPOSE: To provide a picture transmission system for directly transmitting two-dimensional picture information as a two-dimensional optical signal without generating distortion.

CONSTITUTION: An optical beam obtained by the spatial Fourier transformation of a fiber output 1-13 of reference light sent from the receiving side by a prescribed polarized wave, an optical beam obtained by the spatial Fourier transformation of light obtained by previously passing an image optical signal to be transmitted through an optical fiber 1-8 similar to an extremely short transmitting optical fiber and a plane wave 1-11 applied from the reverse direction opposed to the transmission signal are made incident upon a non-linear optical medium 1-4 for generating a **phase conjugate** wave from the transmitting side and the **phase conjugate** wave advancing against the direction of the reference optical beam is generated and propagated to the receiving side through an optical fiber 1-3, so that a picture free from distortion can be obtained on the receiving side and image transmission having no distortion can be attained through a multimode optical fiber.

6/5/3 (Item 3 from file: 347)

DIALOG(R)File 347:JAPIO

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04150892 \*\*Image available\*\*

DEVICE AND METHOD FOR SHAPING OPTICAL PULSE

PUB. NO.: 05-142592 [JP 5142592 A]

PUBLISHED: June 11, 1993 (19930611)

INVENTOR(s): WATANABE HIROTADA

APPLICANT(s): NIKON CORP [000411] (A Japanese Company or Corporation), JP (Japan)

APPL. NO.: 03-310315 [JP 91310315]

FILED: November 26, 1991 (19911126)

INTL CLASS: [5] G02F-001/35; G05D-025/02; **H04B-010/00**

JAPIO CLASS: 29.2 (PRECISION INSTRUMENTS -- Optical Equipment); 22.3 (MACHINERY -- Control & Regulation); 44.2 (COMMUNICATION -- Transmission Systems)

JOURNAL: Section: P, Section No. 1617, Vol. 17, No. 526, Pg. 62, September 21, 1993 (19930921)

#### ABSTRACT

PURPOSE: To provide the optical pulse shaping device and the optical pulse shaping method by which an ultrashort pulse can be obtained with high efficiency by steepening not only the tip part but also the rear end part of an optical pulse.

CONSTITUTION: The device is provided with a saturable absorber 5 for allowing an optical pulse to pass through, and a **phase conjugate** mirror 6 for reflecting the optical pulse passing through the saturable absorber 5, in **phase conjugate** state toward the saturable absorber 5. The optical pulse is allowed to pass through the saturable absorber 5 and the tip part of the optical pulse is steepened, and the passing optical pulse is reflected in **phase conjugate** state toward the saturable absorber 5 by the **phase conjugate** mirror 6, and allowed to pass through the saturable absorber 5 again, by which the tip part and the rear end part of the optical pulse are steepened.

6/5/4 (Item 4 from file: 347)

DIALOG(R)File 347:JAPIO

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03471730 \*\*Image available\*\*

PICTURE TRANSMISSION SYSTEM

November 5, 2002

PUB. NO.: 03-134630 [JP 3134630 A]  
PUBLISHED: June 07, 1991 (19910607)  
INVENTOR(s): FUKUI MASAKI  
KITAYAMA KENICHI  
APPLICANT(s): NIPPON TELEGR & TELEPH CORP <NTT> [000422] (A Japanese  
Company or Corporation), JP (Japan)  
APPL. NO.: 01-272966 [JP 89272966]  
FILED: October 20, 1989 (19891020)  
INTL CLASS: [5] G02F-001/35; G02B-006/00; **H04B-010/00**  
JAPIO CLASS: 29.2 (PRECISION INSTRUMENTS -- Optical Equipment); 44.2  
(COMMUNICATION -- Transmission Systems)  
JAPIO KEYWORD: R009 (HOLOGRAPHY); R012 (OPTICAL FIBERS)  
JOURNAL: Section: P, Section No. 1248, Vol. 15, No. 352, Pg. 7,  
September 06, 1991 (19910906)

#### ABSTRACT

PURPOSE: To obtain a high picture reproducing rate by compensating the distortion due to mode dispersion, which is accompanied with propagation in a multimode optical fiber, with a good controllability in real time in accordance with the change of the characteristic of the multimode optical fiber even at the time when this characteristic is changed with respect to time.

CONSTITUTION: A transmission equipment 10 synthesizes picture signal light IS which is generated from a transmission picture 11-1 and is polarized as prescribed and reference light RW polarized orthogonally to the light IS and transmits the synthesized light by a multimode optical fiber 20, and a picture 11-2 is reproduced by a reception equipment 30. In this equipment 30, the synthesized light where phase distortion or the like due to mode dispersion occurs is separated to the light IS and the reference light RW by a light separating device 31, and both of these light are subjected to Fourier transformation by Fourier transformers 32 and 33. The transformed signal light IS is made incident on a **phase conjugate** wave generator 34, and the transformed reference light RW is made incident on the generator 34 after its polarization direction is equalized to that of the signal light IS. The generator 34 generates a **phase conjugate** wave of the light IS modulated by the light RW and makes it incident on a T converter 35. Thus, distortion due to mode dispersion of the fiber 20 is corrected.

6/5/5 (Item 1 from file: 350)

DIALOG(R)File 350:Derwent WPIX  
(c) 2002 Thomson Derwent. All rts. reserv.

014435607 \*\*Image available\*\*  
WPI Acc No: 2002-256310/200230  
XRPX Acc No: N02-198305

**Remotely interrogated high data rate free space laser communications link, remotely extracts information from communications station by interrogation with low power beam**

Patent Assignee: UNIV CALIFORNIA (REGC )  
Inventor: RUGGIERO A J  
Number of Countries: 095 Number of Patents: 003  
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
WO 200178262	A2	20011018	WO 2001US11197	A	20010406	200230 B
US 20010035995	A1	20011101	US 2000195730	P	20000407	200230
			US 2001827454	A	20010406	
AU 200151384	A	20011023	AU 200151384	A	20010406	200230

Priority Applications (No Type Date): US 2000195730 P 20000407; US  
2001827454 A 20010406  
Patent Details:

November 5, 2002

Patent No Kind Lan Pg Main IPC Filing Notes  
WO 200178262 A2 E 38 H04B-010/00  
Designated States (National): AE AG AL AM AT AU AZ BA BB BG BR BY BZ CA  
CH CN CO CR CU CZ DE DK DM DZ EE ES FI GB GD GE GH GM HR HU ID IL IN IS  
JP KE KG KP KR KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX MZ NO NZ PL  
PT RO RU SD SE SG SI SK SL TJ TM TR TT TZ UA UG UZ VN YU ZA ZW  
Designated States (Regional): AT BE CH CY DE DK EA ES FI FR GB GH GM GR  
IE IT KE LS LU MC MW MZ NL OA PT SD SE SL SZ TR TZ UG ZW  
US 20010035995 A1 H04B-010/00 Provisional application US 2000195730  
AU 200151384 A H04B-010/00 Based on patent WO 200178262

Abstract (Basic): WO 200178262 A2

NOVELTY - The system remotely extracting information from a communications station by interrogation with a low power beam. Nonlinear **phase conjugation** of the low power beam results in a high power encoded return beam that automatically tracks the input beam and is corrected for atmospheric distortion. Intracavity nondegenerate four wave mixing is used in a broad area semiconductor laser in the communications station to produce the return beam.

DETAILED DESCRIPTION - An INDEPENDENT CLAIM is included for a method

USE - For communication using optical **phase conjugation** to establish communications link

ADVANTAGE - Provides low probability of interception, detection or jamming

DESCRIPTION OF DRAWING(S) - The figure shows a perspective view of arrangement where the mobile platform is a geosynchronous satellite forming communications links with several mobile platforms.

pp; 38 DwgNo 3/6

Title Terms: REMOTE; INTERROGATION; HIGH; DATA; RATE; FREE; SPACE; LASER; COMMUNICATE; LINK; REMOTE; EXTRACT; INFORMATION; COMMUNICATE; STATION; INTERROGATION; LOW; POWER; BEAM

Derwent Class: S02; V08; W02; W05

International Patent Class (Main): H04B-010/00

File Segment: EPI

6/5/6 (Item 2 from file: 350)

DIALOG(R)File 350:Derwent WPIX

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013477094 \*\*Image available\*\*

WPI Acc No: 2000-649037/200063

XRPX Acc No: N01-082836

**Signal dispersion compensating method for optical communication network, comprises two concentric rings with same node points, routing is made along route where there is minimum even number of phase conjugating device between terminal nodes**

Patent Assignee: NOKIA NETWORKS OY (OYNO ); NOKIA CORP (OYNO )

Inventor: OKSANEN M

Number of Countries: 090 Number of Patents: 005

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
FI 9900547	A	20000913	FI 99547	A	19990312	200063 B
WO 200055993	A2	20000921	WO 2000FI151	A	20000224	200113
AU 200029186	A	20001004	AU 200029186	A	20000224	200107
US 20020012148	A1	20020131	WO 2000FI151	A	20000224	200210
			US 2001956735	A	20010911	
FI 108488	B1	20020131	FI 99547	A	19990312	200214

Priority Applications (No Type Date): FI 99547 A 19990312

Patent Details:

Patent No Kind Lan Pg Main IPC Filing Notes  
FI 9900547 A H04J-000/00

November 5, 2002

WO 200055993 A2 E 12 H04B-010/18  
Designated States (National): AE AL AM AT AU AZ BA BB BG BR BY CA CH CN  
CR CU CZ DE DK DM EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG KP  
KR KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX NO NZ PL PT RO RU SD SE  
SG SI SK SL TJ TM TR TT TZ UA UG US UZ VN YU ZA ZW  
Designated States (Regional): AT BE CH CY DE DK EA ES FI FR GB GH GM GR  
IE IT KE LS LU MC MW NL OA PT SD SE SL SZ TZ UG ZW  
AU 200029186 A H04B-010/18 Based on patent WO 200055993  
US 20020012148 A1 H04B-010/00 Cont of application WO 2000FI151  
FI 108488 B1 H04J-014/02 Previous Publ. patent FI 9900547

Abstract (Basic): WO 200055993 A2

NOVELTY - A ring network constructed of two concentric rings in such a way that both rings comprise the same node points (NODE1-NODE5) but the number of **phase conjugating** (OPC1-OPC15) device to be installed in the rings, in the optical fibers (OF) between adjacent nodes is, for example, even in the outer ring and odd in the inner ring.

DETAILED DESCRIPTION - An INDEPENDENT CLAIM is also included for an optical communication network.

USE - For compensating signal dispersion carried out by **phase conjugation** in an optical communication network.

ADVANTAGE - Implements dispersion compensation in an optical communication network with **phase conjugation** in such a way that a route having an even number of **phase conjugation** can be found between any two nodes, the result being that the spectrum inversion will not present any problems.

DESCRIPTION OF DRAWING(S) - The figure shows a diagram of an optical communication network realizing the dispersion compensation.

Nodes (NODE1-NODE5)

**Phase conjugating** device (OPC1-OPC15)

Optical fiber (OF)

pp; 12 DwgNo 1/2

Title Terms: SIGNAL; DISPERSE; COMPENSATE; METHOD; OPTICAL; COMMUNICATE; NETWORK; COMPRISE; TWO; CONCENTRIC; RING; NODE; POINT; ROUTE; MADE; ROUTE; MINIMUM; EVEN; NUMBER; PHASE; CONJUGATE; DEVICE; TERMINAL; NODE

Derwent Class: W01; W02

International Patent Class (Main): **H04B-010/00** ; H04B-010/18; H04J-000/00; H04J-014/02

International Patent Class (Additional): H04B-010/12

File Segment: EPI

6/5/7 (Item 3 from file: 350)

DIALOG(R)File 350:Derwent WPIX

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011305479 \*\*Image available\*\*

WPI Acc No: 1997-283384/199726

XRFX Acc No: N97-234644

**Light signal transmitter for optical communication system - passes linearly polarised light wave through phase conjugator and then through optical fibre**

Patent Assignee: FUJITSU LTD (FUJIT )

Inventor: WATANABE S

Number of Countries: 005 Number of Patents: 005

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
EP 776103	A2	19970528	EP 96116586	A	19961016	199726 B
JP 9203914	A	19970805	JP 96128730	A	19960523	199741
US 6175435	B1	20010116	US 96724650	A	19961001	200106
US 6341026	B1	20020122	US 96724650	A	19961001	200208
			US 2000660471	A	20000912	
US 20020114040	A1	20020822	US 96724650	A	19961001	200258
			US 2000660471	A	20000912	

November 5, 2002

US 20014789 A 20011207

Priority Applications (No Type Date): JP 95304229 A 19951122

Cited Patents: No-SR.Pub

Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
EP 776103	A2	E	35	H04B-010/18	
Designated States (Regional): DE FR GB					
JP 9203914	A		27	G02F-001/35	
US 6175435	B1			H04B-010/00	
US 6341026	B1			H04B-010/00	Cont of application US 96724650
					Cont of patent US 6175435
US 20020114040	A1			H04B-010/00	Div ex application US 96724650
					Div ex application US 2000660471
					Div ex patent US 6175435
					Div ex patent US 6341026

Abstract (Basic): EP 776103 A

The light signal transmitter includes one polarisation maintaining fibre which transmits a linear polarised wave light signal. A **phase conjugator** receives this light signal and produces a corresponding **phase conjugate** light signal. A second fibre receives the **phase conjugate** light signal and transmits it. The two fibres have a ratio of dispersions equal to a ratio of their lengths.

A ratio of a product of optical frequency, light intensity and non-linear refractive index of the two fibres is also equal to a ratio of their lengths.

USE - For wavelength division multiplexed system.

ADVANTAGE - Suppresses waveform distortion due to use of **phase conjugator**. Improved reception state.

Dwg.1/27

Title Terms: LIGHT; SIGNAL; TRANSMIT; OPTICAL; COMMUNICATE; SYSTEM; PASS; LINEAR; POLARISE; LIGHT; WAVE; THROUGH; PHASE; CONJUGATE; THROUGH; OPTICAL; FIBRE

Index Terms/Additional Words: OPTICAL; KERR; EFFECT

Derwent Class: P81; V07; W02

International Patent Class (Main): G02F-001/35; **H04B-010/00** ; H04B-010/18

International Patent Class (Additional): H04B-010/02; H04B-010/12

File Segment: EPI; EngPI

6/5/8 (Item 4 from file: 350)

DIALOG(R)File 350:Derwent WPIX

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010908095 \*\*Image available\*\*

WPI Acc No: 1996-405046/199641

XRPX Acc No: N96-341234

Phase - conjugation **light generator for optical-communication system - has second optical transmission line that receives generator non-linear optic medium output and passes it to optical receiver for system wavelength variance compensation**

Patent Assignee: FUJITSU LTD (FUJIT )

Inventor: WATANABE S

Number of Countries: 002 Number of Patents: 002

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
JP 7098464	A	19950411	JP 93221856	A	19930907	199641 B
US 5798853	A	19980825	US 93135626	A	19931014	199841
			US 95468183	A	19950606	
			US 96638535	A	19960426	
			US 96766052	A	19961216	

Priority Applications (No Type Date): JP 93104120 A 19930430; JP 92278662 A 19921016

November 5, 2002

Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
JP 7098464	A		40	G02F-001/35	
US 5798853	A			H04B-010/00	Cont of application US 93135626 Cont of application US 95468183 Cont of application US 96638535

Abstract (Basic): JP 7098464 A

The generator (3) includes a pumping source (7), nonlinear-optic medium (6) and an excitation light supply unit (8). The supply unit receives the light signal (ES2) from an optical transmitter (1) that had passed through a first optical transmission line (2).

The supply unit connected to the pumping source, generates an excitation light to the medium. The medium output (EC1) is fed to an optical receiver (5) through a second optical transmission line (4) in order to compensate the wavelength variance.

ADVANTAGE - Compensates wavelength variance of optical-communication system.

Dwg.11/36

Title Terms: PHASE; CONJUGATE; LIGHT; GENERATOR; OPTICAL; COMMUNICATE; SYSTEM; SECOND; OPTICAL; TRANSMISSION; LINE; RECEIVE; GENERATOR; NON; LINEAR; OPTICAL; MEDIUM; OUTPUT; PASS; OPTICAL; RECEIVE; SYSTEM; WAVELENGTH; VARIANCE; COMPENSATE

Derwent Class: P81; V07; W02

International Patent Class (Main): G02F-001/35; H04B-010/00

International Patent Class (Additional): G02F-001/29; H01S-003/10; H04B-010/02; H04B-010/04; H04B-010/06; H04B-010/14; H04B-010/18

File Segment: EPI; EngPI

6/5/9 (Item 5 from file: 350)

DIALOG(R)File 350:Derwent WPIX

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010606112 \*\*Image available\*\*

WPI Acc No: 1996-103065/199611

XRPX Acc No: N96-086478

Optical image information transmission system - has phase - conjugate wave generator placed in multimode optical fibre cable, spanned between transmitter and receiver, to implement high-quality image transmission

NoAbstract

Patent Assignee: NIPPON TELEGRAPH & TELEPHONE CORP (NITE )

Number of Countries: 001 Number of Patents: 001

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
JP 8008824	A	19960112	JP 94139065	A	19940621	199611 B

Priority Applications (No Type Date): JP 94139065 A 19940621

Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
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JP 8008824	A		6	H04B-010/02	
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Title Terms: OPTICAL; IMAGE; INFORMATION; TRANSMISSION; SYSTEM; PHASE; CONJUGATE; WAVE; GENERATOR; PLACE; MULTIMODE; OPTICAL; FIBRE; CABLE; SPAN ; TRANSMIT; RECEIVE; IMPLEMENT; HIGH; QUALITY; IMAGE; TRANSMISSION; NOABSTRACT

Derwent Class: P81; V07; W02

International Patent Class (Main): H04B-010/02

International Patent Class (Additional): G02F-001/35; H04B-010/00 ; H04B-010/18

File Segment: EPI; EngPI

6/5/10 (Item 6 from file: 350)

DIALOG(R)File 350:Derwent WPIX

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November 5, 2002

010530448    \*\*Image available\*\*

WPI Acc No: 1996-027401/199603

XRPX Acc No: N96-023167

**Optical communication method using light phase conjugate - feeding frequency division multiplex signal into end of optical fibre, and phase conjugate of FDM signal into other end, and end of second optical fibre**

Patent Assignee: FUJITSU LTD (FUIT )

Inventor: WATANABE S

Number of Countries: 002    Number of Patents: 002

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
JP 7301830	A	19951114	JP 9547510	A	19950307	199603 B
US 6304348	B1	20011016	US 95392337	A	19950222	200164
			US 983753	A	19980107	

Priority Applications (No Type Date): JP 9437178 A 19940308

Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
JP 7301830	A		18	G02F-001/35	
US 6304348	B1			H04J-014/02	CIP of application US 95392337

Abstract (Basic): JP 7301830 A

The optical communications method involves modulating carriers as required, and frequency multiplexing generate a FDM signal light. The FDM light signal is input to the first end of an optical fibre, FDM **phase conjugate** light is input to the first end of a second optical fibre. The FDM **phase conjugate** light is modulated.

A prodn. of an average light intensity, a nonlinear refractive index, and a fibre length is about equal to a prod. of those of the second optical fibre.

ADVANTAGE - The influence of cross-talk between channels is eliminated.

Dwg.1/20

Title Terms: OPTICAL; COMMUNICATE; METHOD; LIGHT; PHASE; CONJUGATE; FEED; FREQUENCY; DIVIDE; MULTIPLEX; SIGNAL; END; OPTICAL; FIBRE; PHASE; CONJUGATE; FDM; SIGNAL; END; END; SECOND; OPTICAL; FIBRE

Derwent Class: P81; V07; W02

International Patent Class (Main): G02F-001/35; H04J-014/02

International Patent Class (Additional): **H04B-010/00** ; H04B-010/02; H04B-010/12; H04B-010/18; H04J-014/00

File Segment: EPI; EngPI

6/5/11    (Item 7 from file: 350)

DIALOG(R)File 350:Derwent WPIX

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010418639    \*\*Image available\*\*

WPI Acc No: 1995-319954/199541

XRPX Acc No: N95-240650

**Object identification device using optical phase conjugation , e.g. for military applications - transmits optical radiation towards remote object, selectively deflects outgoing radiation away from initial to alternate path and embeds pre determined pattern into deflected radiation**

Patent Assignee: US SEC OF ARMY (USSA )

Inventor: JORDAN D B; TAYLOR T S

Number of Countries: 001    Number of Patents: 001

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
US 5448052	A	19950905	US 93105162	A	19930812	199541 B

Priority Applications (No Type Date): US 93105162 A 19930812

Patent Details:

November 5, 2002

Patent No Kind Lan Pg Main IPC Filing Notes  
US 5448052 A 8 G01J-001/20

Abstract (Basic): US 5448052 A

The identification device comprises a device for transmitting outgoing probe radiation along an initial optical path toward a remote object, a device for selectively deflecting the outgoing probe radiation away from the initial path to an alternate path and embedding a pre determined pattern into the deflected probe radiation thereby creating patterned radiation. The deflecting and embedding device comprises a liquid crystal filter and a mirror for providing an OR function, the filter and mirror being activated synchronously.

An optical processing device receives the patterned radiation from the deflecting and embedding device and receives incoming probe radiation along a linear optical path from the remote object and processes the radiations together to produce outgoing reference radiation and propagates the outgoing reference radiation along the linear optical path toward the object.

USE/ADVANTAGE - Modern battlefield. To avoid destruction of friendly vehicles. Identification of friend or foe. The utilization of **phase conjugation** eliminates the need for complex aimers in directing radiation toward objects as well as removing any atmospheric distortions from the radiation on its return trip.

Dwg.4/4

Title Terms: OBJECT; IDENTIFY; DEVICE; OPTICAL; PHASE; CONJUGATE; MILITARY; APPLY; TRANSMIT; OPTICAL; RADIATE; REMOTE; OBJECT; SELECT; DEFLECT; OUTGOING; RADIATE; INITIAL; ALTERNATE; PATH; EMBED; PRE; DETERMINE; PATTERN; DEFLECT; RADIATE

Index Terms/Additional Words: OBJ

Derwent Class: S03; W07

International Patent Class (Main): G01J-001/20

International Patent Class (Additional): G06K-009/00; **H04B-010/00**

File Segment: EPI

6/5/12 (Item 8 from file: 350)

DIALOG(R)File 350:Derwent WPIX

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010207386 \*\*Image available\*\*

WPI Acc No: 1995-108640/199515

XRPX Acc No: N95-085862

**Polarisation-insensitive optical four-photon mixer - performs polarisation-insensitive four-photon mixing of optical signals by splitting signals into parallel and perpendicular polarisation components, using different mixing paths**

Patent Assignee: AT & T CORP (AMTT ); SIEMENS AG (SIEI ); AMERICAN TELEPHONE & TELEGRAPH CO (AMTT )

Inventor: KURTZKE C; WIESENFELD J M

Number of Countries: 004 Number of Patents: 007

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
EP 643320	A2	19950315	EP 94306420	A	19940831	199515 B
US 5400164	A	19950321	US 93120013	A	19930910	199517
AU 9472809	A	19950323	AU 9472809	A	19940902	199519
CA 2122382	A	19950311	CA 2122382	A	19940428	199523
JP 7168220	A	19950704	JP 94240849	A	19940909	199535
EP 643320	A3	19960228	EP 94306420	A	19940831	199622
AU 675566	B	19970206	AU 9472809	A	19940902	199714

Priority Applications (No Type Date): US 93120013 A 19930910

Cited Patents: No-SR.Pub; 3.Jnl.Ref; EP 445943; EP 500357

Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
EP 643320	A2 E	14		G02F-001/35	
US 5400164	A	15		H04B-010/00	

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JP 7168220      A      13 G02F-001/35  
AU 675566      B      G02B-027/10      Previous Publ. patent AU 9472809  
AU 9472809      A      G02B-027/10  
CA 2122382      A      H04B-010/18  
EP 643320      A3      G02F-001/35

Abstract (Basic): EP 643320 A

The mixer includes a polarisation splitter (44), and a first mixing path (45) with a first non-linear mixer for mixing the parallel component of the optical signal with a first pump signal having a polarisation aligned with a polarisation of the parallel component to produce mixing products.

A second mixing path (46) has a second non-linear mixer for mixing the perpendicular component with a second pump signal having a polarisation aligned with a polarisation of the perpendicular component producing mixing products. The second mixing path is an optical length equivalent to the length of the first mixing path. A polarisation combiner combines the two products and the parallel and perpendicular components to produce the desired mixing product of the optical signal.

ADVANTAGE - Certain of the mixing products represent **phase conjugates** of the input optical signal, and are therefore useful in compensating for chromatic distortion in optical fibre.

Dwg.4/7

Title Terms: POLARISE; INSENSITIVE; OPTICAL; FOUR; PHOTON; MIX; PERFORMANCE  
; POLARISE; INSENSITIVE; FOUR; PHOTON; MIX; OPTICAL; SIGNAL; SPLIT;  
SIGNAL; PARALLEL; PERPENDICULAR; POLARISE; COMPONENT; MIX; PATH

Derwent Class: P81; V07

International Patent Class (Main): G02B-027/10; G02F-001/35; **H04B-010/00** ;  
H04B-010/18

International Patent Class (Additional): G02B-027/28; H01S-003/00;  
H04B-010/02; H04B-010/04; H04B-010/06; H04B-010/14; H04B-010/26;  
H04B-010/28

File Segment: EPI; EngPI

6/5/13      (Item 9 from file: 350)

DIALOG(R)File 350:Derwent WPIX

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010174135      \*\*Image available\*\*

WPI Acc No: 1995-075388/199510

XRPX Acc No: N95-059707

**Compensating for dispersion in optical communication system - using semiconductor optical amplifier for generating phase conjugate of optical signal by non degenerate four wave mixing**

Patent Assignee: BRITISH TELECOM PLC (BRTE )

Inventor: SHERLOCK G; TATHAM M C

Number of Countries: 022      Number of Patents: 009

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
WO 9503653	A1	19950202	WO 94GB602	A	19940323	199510 B
AU 9462866	A	19950220	AU 9462866	A	19940323	199521
EP 710413	A1	19960508	EP 94910457	A	19940323	199623
			WO 94GB602	A	19940323	
JP 9500504	W	19970114	WO 94GB602	A	19940323	199712
			JP 95504991	A	19940323	
AU 687384	B	19980226	AU 9462866	A	19940323	199821
US 5861970	A	19990119	WO 94GB602	A	19940323	199911
			US 96586634	A	19960129	
CA 2165564	C	20000516	CA 2165564	A	19940323	200038
			WO 94GB602	A	19940323	
EP 710413	B1	20010919	EP 94910457	A	19940323	200155
			WO 94GB602	A	19940323	
DE 69428359	E	20011025	DE 628359	A	19940323	200171
			EP 94910457	A	19940323	

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WO 94GB602 A 19940323

Priority Applications (No Type Date): GB 9315011 A 19930720

Cited Patents: 03Jnl.Ref; EP 375253; JP 4081724

Patent Details:

Patent No Kind Lan Pg Main IPC Filing Notes

WO 9503653 A1 E 38 H04B-010/18

Designated States (National): AU CA FI JP US

Designated States (Regional): AT BE CH DE DK ES FR GB GR IE IT LU MC NL  
PT SE

AU 9462866 A Based on patent WO 9503653

EP 710413 A1 E 38 Based on patent WO 9503653

Designated States (Regional): BE CH DE DK ES FR GB IT LI NL PT SE

JP 9500504 W 40 H04B-010/02 Based on patent WO 9503653

AU 687384 B Previous Publ. patent AU 9462866

Based on patent WO 9503653

US 5861970 A H04B-010/00 Based on patent WO 9503653

CA 2165564 C E H04B-010/18 Based on patent WO 9503653

EP 710413 B1 E H01S-005/40 Based on patent WO 9503653

Designated States (Regional): BE CH DE DK ES FR GB IT LI NL PT SE

DE 69428359 E H01S-005/40 Based on patent EP 710413

Based on patent WO 9503653

Abstract (Basic): WO 9503653 A

The method involves combining an optical signal generated by a distributed feedback laser (1), with pump radiation produced by a pump laser (2). The combined output of the two lasers is transmitted along an optical fibre (3), amplified (4) and then coupled into a semiconductor optical amplifier (5).

The optical signal and the pump radiation interact within the semiconductor optical amplifier and generate the **phase conjugate** of the optical signal. An optical bandpass filter (6), following the semiconductor optical amplifier, allows only the **phase conjugate** of the optical signal to be transmitted along a second optical fibre (2).

ADVANTAGE - Requires less stringent wavelength matching of optical signal and pump radiation.

Dwg.8/13

Title Terms: COMPENSATE; DISPERSE; OPTICAL; COMMUNICATE; SYSTEM;

SEMICONDUCTOR; OPTICAL; AMPLIFY; GENERATE; PHASE; CONJUGATE; OPTICAL;

SIGNAL; NON; DEGENERATE; FOUR; WAVE; MIX

Derwent Class: V07; W02

International Patent Class (Main): H01S-005/40; **H04B-010/00** ; H04B-010/02;  
H04B-010/18

International Patent Class (Additional): H01S-003/25

File Segment: EPI

6/5/14 (Item 10 from file: 350)

DIALOG(R)File 350:Derwent WPIX

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010098614 \*\*Image available\*\*

WPI Acc No: 1994-366327/199445

XRPX Acc No: N94-286927

**Ultra-high capacity non-soliton optical transmission method using phase conjugation - adjusts in-line amplifier number, spacing, and-or output power to compensate for interaction between first order dispersion and fibre nonlinearity dispersion in given optical fibre span**

Patent Assignee: AT & T CORP (AMTT ); SIEMENS AG (SIEI ); AMERICAN

TELEPHONE & TELEGRAPH CO (AMTT ); TYCO SUBMARINE SYSTEMS LTD (TYCO-N);

AT & T BELL LAB (AMTT )

Inventor: GNAUCK A H; KURTZKE C

Number of Countries: 011 Number of Patents: 007

Patent Family:

Patent No Kind Date Applicat No Kind Date Week

November 5, 2002

US 5365362	A	19941115	US 93120014	A	19930910	199445	B
EP 643498	A1	19950315	EP 94306419	A	19940831	199515	
AU 9472801	A	19950323	AU 9472801	A	19940902	199519	
CA 2124124	A	19950311	CA 2124124	A	19940524	199523	
JP 7154324	A	19950616	JP 94240851	A	19940909	199533	
AU 681689	B	19970904	AU 9472801	A	19940902	199744	
CA 2124124	C	19991207	CA 2124124	A	19940524	200017	

Priority Applications (No Type Date): US 93120014 A 19930910

Cited Patents: 2.Jnl.Ref

Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
US 5365362	A		15	H04B-010/00	
CA 2124124	C	E		H04B-010/12	
EP 643498	A1	E	17	H04B-010/18	
Designated States (Regional): DE DK ES FR GB GR IT					
JP 7154324	A		13	H04B-010/02	
AU 681689	B			H04B-010/18	Previous Publ. patent AU 9472801
AU 9472801	A			H04B-010/18	
CA 2124124	A			H04B-010/12	

Abstract (Basic): US 5365362 A

The method of optical signal transmission involves providing an optical fibre span comprising at least one segment. An optical signal transmitter is provided at one end of the span for supplying an optical signal, and an optical signal receiver at an opposite end of the fibre. At least one in-line amplifier is provided within each portion of the segment of the fibre span.

The optical signal is **phase conjugated** in a device located between the two portions of the segment. The power level of the optical signal is adjusted in at least one portion of at least one fibre segment to compensate for a nonlinearity of the fibre span. The power level adjustment includes adjusting a position of the in-line amplifier within at least one portion of at least one segments of the fibre span.

ADVANTAGE - Improved multi-channel optical **phase conjugation** system design. Achieves bit rate distance products on order of 200 Tbits/s-km.

Dwg.2/8

Title Terms: ULTRA; HIGH; CAPACITY; NON; OPTICAL; TRANSMISSION; METHOD; PHASE; CONJUGATE; ADJUST; LINE; AMPLIFY; NUMBER; SPACE; AND-OR; OUTPUT; POWER; COMPENSATE; INTERACT; FIRST; ORDER; DISPERSE; FIBRE; NONLINEAR; DISPERSE; OPTICAL; FIBRE; SPAN

Derwent Class: W02

International Patent Class (Main): **H04B-010/00** ; H04B-010/02; H04B-010/12; H04B-010/18

International Patent Class (Additional): H04B-010/16

File Segment: EPI

6/5/15 (Item 11 from file: 350)

DIALOG(R)File 350:Derwent WPIX

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009896579 \*\*Image available\*\*

WPI Acc No: 1994-176495/199421

XRPX Acc No: N94-139016

**Universal Identification of Friend or Foe technique - using real time communications link between two parties to establish positive identification using pump laser and remote laser beacon**

Patent Assignee: US SEC OF ARMY (USSA )

Inventor: CLARK W W; SALAMO G J; SHARP E J; WOOD G L

Number of Countries: 001 Number of Patents: 001

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
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November 5, 2002

US 5317442      A    19940531    US 9398999      A    19930729    199421    B

Priority Applications (No Type Date): US 9398999 A 19930729

Patent Details:

Patent No	Kind	Lan Pg	Main IPC	Filing Notes
US 5317442	A	11	H04B-010/00	

Abstract (Basic): US 5317442 A

The method involves providing a signal from a pumped laser at one position and modulating it. A second signal is generated from a remote laser beacon at a second position at the same wavelength as the first signal. A detector senses a signal at the second position. The second signal is transmitted in a predetermined pattern from the second position. The modulated first signal is input into a mutually pumped **phase conjugation** mirror (MPPCM) at the first position to establish a MPPCM beam fan field of view.

The MPPCM beam fan scans a predetermined field of view. A unit detects a signal at the first position. The transmitted second signal is detected at the first position. A two-way **phase conjugated** signal is established by uniting the two signals in the MPPCM so that each signal generates simultaneously a temporally modulated **phase conjugated** return of the other of the signals effecting lock-on. The first signal is modulated at the first position. The two-way **phase** modulated **conjugation** signal is detected at the two positions.

ADVANTAGE - Allows approximately immediate transfer of digital information with positive longitudinal direction and identification of both distinct positions. Not dependent on environmental conditions.

Dwg.5/5

Title Terms: UNIVERSAL; IDENTIFY; FRIEND; FOE; TECHNIQUE; REAL; TIME; COMMUNICATE; LINK; TWO; PARTY; ESTABLISH; POSITIVE; IDENTIFY; PUMP; LASER; REMOTE; LASER; BEACON

Index Terms/Additional Words: IFF

Derwent Class: W06; W07

International Patent Class (Main): H04B-010/00

File Segment: EPI

6/5/16      (Item 12 from file: 350)

DIALOG(R)File 350:Derwent WPIX

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009781318      \*\*Image available\*\*

WPI Acc No: 1994-061171/199408

XRPX Acc No: N94-048456

**Image data transfer system for HDTV receiver - use multimode optical fibre to transmit phase conjugation waves for carrying image signals superposed by phase distortion of optical fibre**    NoAbstract

Patent Assignee: NIPPON TELEGRAPH & TELEPHONE CORP (NITE )

Number of Countries: 001    Number of Patents: 001

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
JP 6014324	A	19940121	JP 92166352	A	19920624	199408    B

Priority Applications (No Type Date): JP 92166352 A 19920624

Patent Details:

Patent No	Kind	Lan Pg	Main IPC	Filing Notes
JP 6014324	A	6	H04N-007/22	

Abstract (Basic): JP 6014324 A

Dwg.1/6

Title Terms: IMAGE; DATA; TRANSFER; SYSTEM; HDTV; RECEIVE; MULTIMODE; OPTICAL; FIBRE; TRANSMIT; PHASE; CONJUGATE; WAVE; CARRY; IMAGE; SIGNAL; SUPERPOSED; PHASE; DISTORT; OPTICAL; FIBRE; NOABSTRACT

Derwent Class: W02

International Patent Class (Main): H04N-007/22

November 5, 2002

International Patent Class (Additional): **H04B-010/00**  
File Segment: EPI

6/5/17 (Item 13 from file: 350)  
DIALOG(R)File 350:Derwent WPIX  
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009527864 \*\*Image available\*\*  
WPI Acc No: 1993-221404/199328  
XRPX Acc No: N93-169697

**Light pulse shaper for super-short pulse - uses combination of phase conjugate mirror and saturable absorption material NoAbstract**

Patent Assignee: NIKON CORP (NIKR )  
Number of Countries: 001 Number of Patents: 001  
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
JP 5142592	A	19930611	JP 91310315	A	19911126	199328 B

Priority Applications (No Type Date): JP 91310315 A 19911126

Patent Details:

Patent No	Kind	Lan Pg	Main IPC	Filing Notes
JP 5142592	A	5	G02F-001/35	

Abstract (Basic): JP 5142592 A  
Dwg.1/2

Title Terms: LIGHT; PULSE; SHAPE; SUPER; SHORT; PULSE; COMBINATION; PHASE;  
CONJUGATE; MIRROR; SATURATE; ABSORB; MATERIAL; NOABSTRACT

Derwent Class: P81; V07; W02

International Patent Class (Main): G02F-001/35

International Patent Class (Additional): G05D-025/02; **H04B-010/00**

File Segment: EPI; EngPI

6/5/18 (Item 14 from file: 350)  
DIALOG(R)File 350:Derwent WPIX  
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008245027 \*\*Image available\*\*  
WPI Acc No: 1990-132028/199017  
XRPX Acc No: N90-102269

**Reference frequency distribution system using fibre-optic transfer - uses phase conjugator to adjust phase of reference frequency w.r.t. that modulating light beam to maintain conjugate relationship**

Patent Assignee: NAT AERO & SPACE ADMIN (USAS )

Inventor: LUTES G; PRIMAS L; SYDNOR R

Number of Countries: 001 Number of Patents: 002

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
US 7359801	N	19900306	US 8929191	A	19890531	199017 B
US 5031234	A	19910709	US 89359801	A	19890531	199130

Priority Applications (No Type Date): US 8929191 A 19890531; US 89359801 A 19890531

Abstract (Basic): US 7359801 N

A reference frequency is transmitted from a reference unit to a remote unit while keeping the reference frequency at the reference unit and remote unit in phase via a fibre optic cable. A frequency source at the reference unit produces a reference frequency having an adjustable phase. A fibre optic transmitter at the reference unit modulates a light beam with the reference frequency and transmits the light beam into the fibre optic cable. A 50/50 reflector at the remote unit reflects a first portion of the light beam back into the cable to the reference unit. A fibre optic receiver disposed at the remote unit

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receives a second portion of the light beam and demodulates the reference frequency to be used at the remote unit.

A second receiver disposed at the reference unit receives the first portion of the light beam and demodulates a reference frequency component. A **phase conjugator** is connected to the frequency source for comparing the phase of the reference frequency component to the phase of the reference frequency modulating the light beam being transmitted from the reference unit and for continuously adjusting the phase of the reference frequency modulating the light beam being transmitted from the reference unit to maintain a conjugate (anti-symmetric) relationship, so that virtually no phase difference exists between the phase of the reference frequency component and the phase of the reference frequency modulating the light beam.

USE/ADVANTAGE - Transmits 100 MHz ref. signal generated by hydrogen maser frequency standard over distance of 22 km. Maintains stability of one part in 10 power17 for 1000 seconds averaging time. Reduced group delay variations.

US 7359801 A

A reference frequency is transmitted from a reference unit to a remote unit while keeping the reference frequency at the reference unit and remote unit in phase via a fibre optic cable. A frequency source at the reference unit produces a reference frequency having an adjustable phase. A fibre optic transmitter at the reference unit modulates a light beam with the reference frequency and transmits the light beam into the fibre optic cable. A 50/50 reflector at the remote unit reflects a first portion of the light beam back into the cable to the reference unit. A fibre optic receiver disposed at the remote unit receives a second portion of the light beam and demodulates the reference frequency to be used at the remote unit.

A second receiver disposed at the reference unit receives the first portion of the light beam and demodulates a reference frequency component. A **phase conjugator** is connected to the frequency source for comparing the phase of the reference frequency component to the phase of the reference frequency modulating the light beam being transmitted from the reference unit and for continuously adjusting the phase of the reference frequency modulating the light beam being transmitted from the reference unit to maintain a conjugate (anti-symmetric) relationship, so that virtually no phase difference exists between the phase of the reference frequency component and the phase of the reference frequency modulating the light beam.

USE/ADVANTAGE - Transmits 100 MHz ref. signal generated by hydrogen maser frequency standard over distance of 22 km. Maintains stability of one part in 10 power17 for 1000 seconds averaging time. Reduced group delay variations.

Dwg.2/9

Title Terms: REFERENCE; FREQUENCY; DISTRIBUTE; SYSTEM; FIBRE-OPTIC; TRANSFER; PHASE; CONJUGATE; ADJUST; PHASE; REFERENCE; FREQUENCY; MODULATE ; LIGHT; BEAM; MAINTAIN; CONJUGATE; RELATED

Derwent Class: W02

International Patent Class (Additional): H04B-000/01; **H04B-010/00**

File Segment: EPI

**6/5/19 (Item 15 from file: 350)**

DIALOG(R)File 350:Derwent WPIX

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007280734

WPI Acc No: 1987-277741/198739

XRPX Acc No: N87-208192

**Information encoding system for optical beam - applies alternating electric field to photo-refractive material to modulate beam by varying index ellipsoid via electro-optic effect**

Patent Assignee: HUGHES AIRCRAFT CO (HUGA )

Inventor: PEPPER M D; PEPPER D M



November 5, 2002

Number of Countries: 015 Number of Patents: 011

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week	
WO 8705715	A	19870924	WO 87US292	A	19870212	198739	B
NO 8704829	A	19880104				198807	
EP 262177	A	19880406	EP 87901866	A	19870212	198814	
US 4767195	A	19880830	US 86842344	A	19860321	198837	
JP 63503330	W	19881202	JP 87501620	A	19870212	198903	
ES 2003008	A	19881001	ES 842344	A	19860321	198929	
IL 81694	A	19920115				199209	
EP 262177	B1	19920930	EP 87901866	A	19870212	199240	
			WO 87US292	A	19870212		
DE 3781989	G	19921105	DE 3781989	A	19870212	199246	
			EP 87901866	A	19870212		
			WO 87US292	A	19870212		
KR 9204628	B1	19920612	WO 87US292	A	19870212	199351	
			KR 87701074	A	19871120		
NO 175878	B	19940912	WO 87US292	A	19870212	199436	
			NO 874829	A	19871119		

Priority Applications (No Type Date): US 86842344 A 19860321

Cited Patents: 9.Jnl.Ref; GB 2135050

Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
WO 8705715	A	E	30		
				Designated States (National):	JP KR NO
				Designated States (Regional):	BE CH DE FR GB IT NL SE
EP 262177	A	E			
				Designated States (Regional):	BE CH DE FR GB IT LI NL SE
US 4767195	A		12		
EP 262177	B1	E	22	G02F-001/35	Based on patent WO 8705715
				Designated States (Regional):	BE CH DE FR GB IT LI NL SE
DE 3781989	G			G02F-001/35	Based on patent EP 262177
					Based on patent WO 8705715
NO 175878	B			G02F-001/35	patent NO 8704829
KR 9204628	B1			G02B-005/23	

Abstract (Basic): WO 8705715 A

A carrier signal, provided by an alternating voltage source (8) is connected to crystal electrodes (14,16). A modulator (19) superimposes a modulated electric field onto the field established across the crystal.

The information contained in the modulating signal is impressed onto the output beam by the modulated carrier signal's influence upon the index ellipsoid of the photorefractive material (18) via the electro-optic effect. The output beam (20A) is also impressed by modulated carrier signals within the same frequency regime as the electric field source (21), as well as by a modulation of the crystal's photorefractive response.

USE/ADVANTAGE - Both externally pumped and self-pumped **phase conjugate** mirrors and other optical systems. Can encode information onto laser beam at h.f. carrier level well above characteristic laser noise bandwidth, thus isolating information from laser's noise spectrum.

/11

Title Terms: INFORMATION; ENCODE; SYSTEM; OPTICAL; BEAM; APPLY; ALTERNATE; ELECTRIC; FIELD; PHOTO; REFRACT; MATERIAL; MODULATE; BEAM; VARY; INDEX; ELLIPSOID; ELECTRO-OPTICAL; EFFECT

Index Terms/Additional Words: LASER; COMMUNICATE; CHANNEL

Derwent Class: P81; P84; V07

International Patent Class (Main): G02B-005/23; G02F-001/35

International Patent Class (Additional): G02F-001/03; G03H-001/02;

H01S-003/10; H04B-009/00; **H04B-010/00**

File Segment: EPI; EngPI

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9/5/1 (Item 1 from file: 350)  
DIALOG(R)File 350:Derwent WPIX  
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003837026

WPI Acc No: 1983-833276/198348

XRPX Acc No: N83-216357

**Synchronously pumped phase conjugate laser - in which laser pulses of high peak power and low average power are applied from pulsed pump source**

Patent Assignee: HUGHES AIRCRAFT CO (HUGA )

Inventor: GUILIANO C R; JAIN R K

Number of Countries: 008 Number of Patents: 008

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
WO 8304144	A	19831124				198348 B
EP 109411	A	19840530	EP 83901562	A	19830414	198423
JP 59500888	W	19840517	JP 83501456	A	19830414	198426
US 4493086	A	19850108	US 82379837	A	19820520	198504
EP 109411	B	19861230				198701
DE 3368822	G	19870205				198706
IL 68365	A	19870130				198710
IT 1180653	B	19870923				199037

Priority Applications (No Type Date): US 82379837 A 19820520

Cited Patents: 3.Jnl.Ref; EP 9108; FR 2247835; US 4220928; US 4321550

Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
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WO 8304144	A	E	16		
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Designated States (National): JP

Designated States (Regional): DE FR GB SE

EP 109411	A	E			
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Designated States (Regional): DE FR GB SE

EP 109411	B	E			
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Designated States (Regional): DE FR GB SE

Abstract (Basic): WO 8304144 A

The **laser** (20) has a **phase - conjugate** reflector (21), lasing medium (22) and an output coupling device (23). The **phase - conjugate** reflector and the lasing medium are both pumped by, respectively, the pulsed pump source (24) and a pump source (25). The pulsed pump source is e.g. a Q-switched mode-locked neodymium yttrium aluminium garnet **laser** which generates four-wave mixing in the **phase conjugate** reflector. The non-linear medium in the **phase - conjugate** reflector may be gaseous sodium.

The output coupling device (23) is an arrangement of mirrors which reflect four-fifths of the energy and transmit one fifth as the output **beam** of the **laser**. The pulses from the pulsed pump source are split by a **beam** splitter and applied to opposite ends of the non-linear medium. When both pulses are incident on the medium within a time less than its coherence time and the **probe** is correctly timed then a backscattered pulse is **produced** which is the **phase conjugate** of the **probe** pulse.

Title Terms: SYNCHRONOUS; PUMP; PHASE; CONJUGATE; **LASER** ; **LASER** ; PULSE; HIGH; PEAK; POWER; LOW; AVERAGE; POWER; APPLY; PULSE; PUMP; SOURCE

Derwent Class: V08

International Patent Class (Additional): H01S-003/10

File Segment: EPI

November 5, 2002

14/5/1 (Item 1 from file: 350)  
DIALOG(R)File 350:Derwent WPIX  
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013905215 \*\*Image available\*\*  
WPI Acc No: 2001-389428/200141  
XRPX Acc No: N01-286446

**Bidirectional pulsed ring laser generation for magnetic susceptibility detector, involves locating light intensity dependent crystal near beam waist of laser cavity having aperture to alter beam diameter**

Patent Assignee: BOHN M J (BOHN-I); UNIV NEW MEXICO STATE (UYNE-N)

Inventor: BOHN M J; DANG T T; DIELS J M; JONES R J

Number of Countries: 091 Number of Patents: 002

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
WO 200072411	A1	20001130	WO 2000US11516	A	20000428	200141 B
AU 200068886	A	20001212	AU 200068886	A	20000428	200141

Priority Applications (No Type Date): US 2000131843 A 20000427; US 99131843 P 19990430

Patent Details:

Patent No	Kind	Lan Pg	Main IPC	Filing Notes
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WO 200072411	A1	E 63	H01S-003/083	
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Designated States (National): AE AG AL AM AT AU AZ BA BB BG BR BY CA CH  
CN CR CU CZ DE DK DM EE ES FI GB GD GE GH GM HR HU ID IL IN IS JP KE KG  
KP KR KZ LC LK LR LS LT LU LV MA MD MG MK MN MW MX NO NZ PL PT RO RU SD  
SE SG SI SK SL TJ TM TR TT TZ UA UG US UZ VN YU ZA ZW

Designated States (Regional): AT BE CH CY DE DK EA ES FI FR GB GH GM GR  
IE IT KE LS LU MC MW NL OA PT SD SE SL SZ TZ UG ZW

AU 200068886	A		H01S-003/083	Based on patent WO 200072411
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Abstract (Basic): WO 200072411 A1

NOVELTY - A light intensity dependent crystal (4) is placed near beam waist of laser cavity selected from group of Ti:sapphire laser, Nd:vanadate laser and Cr:LISAF laser. Laser cavity has aperture to alter beam diameter with self-lensing effect of substance to produce bi-directional short light pulses which are phase conjugated. Light pulses are electronically modulated and their launching time is controlled by unidirectional amplification.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for the following:

- (a) magnetic susceptibility detector;
- (b) bi-directional pulsed ring laser.

USE - For navigational purposes, magnetic susceptibility detector, measurement of small displacement, measurement of high voltage, magnetic and electric fields, etc.

ADVANTAGE - Since the short pulses of light waves are used, occurrence of lock-in due to the scattering of one circulating beam to the other beam in opposite direction is avoided. Since the light pulses are electronically modulated and the launching time of the light pulses is controlled, light pulses do not cross at any component within the laser cavity and hence dead band does not occur thereby providing sensitive measurements.

DESCRIPTION OF DRAWING(S) - The figure shows configuration of ring laser.

Crystal (4)  
pp; 63 DwgNo 1/20

Title Terms: BIDIRECTIONAL; PULSE; RING; LASER; GENERATE; MAGNETIC;  
SUSCEPTIBILITY; DETECT; LOCATE; LIGHT; INTENSITY; DEPEND; CRYSTAL; BEAM;  
WAIST; LASER; CAVITY; APERTURE; ALTER; BEAM; DIAMETER

Derwent Class: S01; S02; V08

International Patent Class (Main): H01S-003/083

File Segment: EPI

November 5, 2002

14/5/2 (Item 2 from file: 350)  
DIALOG(R)File 350:Derwent WPIX  
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011296655 \*\*Image available\*\*  
WPI Acc No: 1997-274560/199725  
XRPX Acc No: N97-227394

Phase conjugate wave generating apparatus - supplies electric current to laser to oscillate pump beam, and detects phase conjugate beams from laser output by injecting probe beam into laser for oscillating pump beam laser

Patent Assignee: FUJITSU LTD (FUIT )  
Inventor: KUWATSUKA H  
Number of Countries: 006 Number of Patents: 005  
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
EP 774810	A2	19970521	EP 96308248	A	19961114	199725 B
JP 9199808	A	19970731	JP 96250710	A	19960920	199741
US 5751758	A	19980512	US 96746646	A	19961113	199826
KR 97031112	A	19970626	KR 9653456	A	19961112	199828
KR 256157	B1	20000515	KR 9653456	A	19961112	200128

Priority Applications (No Type Date): JP 96250710 A 19960920; JP 95296524 A 19951115

Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
EP 774810	A2	E	15	H01S-003/25	
Designated States (Regional): DE FR GB					
JP 9199808	A		10	H01S-003/18	
US 5751758	A			H01S-003/08	
KR 97031112	A			H01S-003/00	
KR 256157	B1			H01S-003/00	

Abstract (Basic): EP 774810 A

The apparatus includes a distributed feedback semiconductor laser (1) with optical output and input ends, reflection free films (22X), capable of transmitting phase conjugate waves, formed on the ends, and a grating structure enabling single mode oscillation. A probe beam (8) generates a beam into the input end of the laser.

Electric current (7) is supplied to the laser to oscillate a pump beam. The phase conjugate beams are detected from the output end of the laser by injecting the probe beam into the laser for oscillating the pump beam. The laser has a wavelength variable structure.

ADVANTAGE - Apparatus is simple and generates phase conjugate waves not dependent on Fabry-Perot mode.

Dwg.2/7

Title Terms: PHASE; CONJUGATE; WAVE; GENERATE; APPARATUS; SUPPLY; ELECTRIC; CURRENT; LASER; OSCILLATING; PUMP; BEAM; DETECT; PHASE; CONJUGATE; BEAM; LASER; OUTPUT; INJECTION; PROBE; BEAM; LASER; OSCILLATING; PUMP; BEAM; LASER

Derwent Class: P81; U12; V07; V08; W02

International Patent Class (Main): H01S-003/00; H01S-003/08; H01S-003/18; H01S-003/25

International Patent Class (Additional): G02F-001/35; H01S-003/10; H01S-003/103; H04B-010/18

File Segment: EPI; EngPI

14/5/3 (Item 3 from file: 350)  
DIALOG(R)File 350:Derwent WPIX  
(c) 2002 Thomson Derwent. All rts. reserv.

010958651 \*\*Image available\*\*  
WPI Acc No: 1996-455601/199645

November 5, 2002

XRPX Acc No: N96-383853

**Radiation beam producing method which is phase conjugate of input radiation beam - arranging input beam incident on crystal at obtuse angle to +B direction of crystal, crystal acts as self pumped phase conjugate mirror, performs phase conjugate process in crystal due to photo refraction**

Patent Assignee: UNIV COLLEGE LONDON (UNLO )

Inventor: CHANG C C; SELVIAH D R

Number of Countries: 019 Number of Patents: 001

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
WO 9630802	A1	19961003	WO 96GB729	A	19960327	199645 B

Priority Applications (No Type Date): GB 956180 A 19950327

Cited Patents: 7.Jnl.Ref

Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
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WO 9630802	A1	E	74	G02F-001/35	
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Designated States (National): JP US

Designated States (Regional): AT BE CH DE DK ES FI FR GB GR IE IT LU MC NL PT SE

Abstract (Basic): WO 9630802 A

The method involves directing the input beam (Iin) onto a face of a photo refractive crystal such that the beam passes into the crystal. A phase conjugation process is performed in the crystal due to the photo refractive nature of the crystal and the interaction of the beam with itself or another beam.

The phase conjugate beam (Ipc) is obtained from the radiation after diffraction. The input beam is arranged to be incident on the first face of the crystal at an obtuse angle to the +B direction of the crystal. The crystal acts as a self pumped phase conjugate mirror.

USE/ADVANTAGE - Phase conjugation occurs across wide range of input angles and beam positions. Over different combinations of angular range and position internal beam loops change form but these changes need not affect smoothness of phase conjugate response.

Dwg.7A/36

Title Terms: RADIATE; BEAM; PRODUCE; METHOD; PHASE; CONJUGATE; INPUT; RADIATE; BEAM; ARRANGE; INPUT; BEAM; INCIDENT; CRYSTAL; OBTUSE; ANGLE; DIRECTION; CRYSTAL; CRYSTAL; ACT; SELF; PUMP; PHASE; CONJUGATE; MIRROR; PERFORMANCE; PHASE; CONJUGATE; PROCESS; CRYSTAL; PHOTO; REFRACT

Derwent Class: P81; V07

International Patent Class (Main): G02F-001/35

File Segment: EPI; EngPI

14/5/4 (Item 4 from file: 350)

DIALOG(R)File 350:Derwent WPIX

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009204938 \*\*Image available\*\*

WPI Acc No: 1992-332359/199241

XRAM Acc No: C94-022287

XRPX Acc No: N94-038728

**Barium strontium titanate photorefractive device for opto-electronics - is based on single domain crystal and has self-pumped phase conjugation with high reflectivity**

Patent Assignee: FUJIAN INST MATTER STRUCT CHINESE ACAD (FUJI-N); FUJIAN INST RES STRUCTURE OF MATTER (FUJI-N)

Inventor: GAO X; LI G; ZHUANG J; GUO X; HUANG Y; LU J; SHI Z; WENG Y

Number of Countries: 003 Number of Patents: 003

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
CN 1058433	A	19920205	CN 90104945	A	19900726	199241 B
US 5287213	A	19940215	US 91730558	A	19910716	199407

November 5, 2002

US 9317350 A 19930211  
CN 1025634 C 19940810 CN 90104945 A 19900726 199536

Priority Applications (No Type Date): CN 90104945 A 19900726

Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
US 5287213	A		5	G02B-005/14	Cont of application US 91730558
CN 1058433	A			C30B-029/32	
CN 1025634	C			C30B-029/32	

Abstract (Basic): US 5287213 A

A photo-refractive device comprises means of directing a laser beam (1) into a photo-refractive crystal (4) which changes the space distribution of the refractive index so that a **phase conjugate beam** is **produced** by a self-pumped mechanism. The crystal is single domain Ba<sub>1-x</sub>Sr<sub>x</sub>TiO<sub>3</sub>, where x is 0.01-0.1, grown by the Czochralski method and poled by applying uniaxial mechanical pressure along each a-axis of the polished crystal alternately, heating to 1-10 deg.C below the Curie temp., applying a d.c. electric field of 1-7 kV/cm, then cooling to room temp. in the presence of the field and then removing the field.

USE/ADVANTAGE - For optoelectronic assemblies, photo-refractive devices and for self-pumped phase conjugation at 450-650 nm. Single domain crystals of BST are formed easily, rapidly, and of large size, and have excellent photo-refractive properties. Reflectivity may be up to 52% and self-pumped phase conjugation is realised between 450 and 650 nm. (First major country equivalent to basic CN1058433-A).

(Dwg.1/2)

Title Terms: BARIUM; STRONTIUM; TITANATE; PHOTO; REFRACT; DEVICE; OPTO; ELECTRONIC; BASED; SINGLE; DOMAIN; CRYSTAL; SELF; PUMP; PHASE; CONJUGATE; HIGH; REFLECT

Derwent Class: E33; G06; L03; P81; P84; V07

International Patent Class (Main): C30B-029/32; G02B-005/14

International Patent Class (Additional): C30B-015/00; C30B-033/02;

G02B-005/23; G02F-001/39; G03H-001/02

File Segment: CPI; EPI; EngPI

14/5/5 (Item 5 from file: 350)

DIALOG(R)File 350:Derwent WPIX

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009204559 \*\*Image available\*\*

WPI Acc No: 1992-331991/199240

XRAM Acc No: C92-147637

XRPX Acc No: N92-253566

**Dye laser amplifier for optical communication system - stimulates  
brillovian scattering dye cell receiving both dye laser light and pump  
beam along common optical path**

Patent Assignee: UK SEC FOR DEFENCE (MINA )

Inventor: COOK G

Number of Countries: 017 Number of Patents: 008

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
WO 9216038	A1	19920917	WO 92GB410	A	19920309	199240 B
EP 528006	A1	19930224	EP 92906513	A	19920309	199308
			WO 92GB410	A	19920309	
GB 2259604	A	19930317	WO 92GB410	A	19920309	199311
			GB 9223124	A	19921104	
JP 5507588	W	19931028	JP 92505827	A	19920309	199348
			WO 92GB410	A	19920309	
EP 528006	B1	19941019	EP 92906513	A	19920309	199440
			WO 92GB410	A	19920309	
DE 69200538	E	19941124	DE 600538	A	19920309	199501
			EP 92906513	A	19920309	

November 5, 2002

US 5379147	A	19950103	WO 92GB410	A	19920309	
			WO 92GB410	A	19920309	199511
			US 93960386	A	19930111	
GB 2259604	B	19950322	WO 92GB410	A	19920309	199515
			GB 9223124	A	19921104	

Priority Applications (No Type Date): GB 915058 A 19910311

Cited Patents: 3.Jnl.Ref; US 4875219

Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
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WO 9216038	A1	E	21	H01S-003/23	
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Designated States (National): GB JP US

Designated States (Regional): AT BE CH DE DK ES FR GB GR IT LU MC NL SE

EP 528006	A1	E	21	H01S-003/23	Based on patent WO 9216038
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Designated States (Regional): AT BE CH DE DK FR GB IT LI LU NL SE

GB 2259604	A		21	H01S-003/30	Based on patent WO 9216038
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JP 5507588	W		9	H01S-003/108	Based on patent WO 9216038
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EP 528006	B1	E	11	H01S-003/23	Based on patent WO 9216038
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Designated States (Regional): BE DE FR GB IT NL SE

DE 69200538	E			H01S-003/23	Based on patent EP 528006
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Based on patent WO 9216038

US 5379147	A		8	H01S-003/08	Based on patent WO 9216038
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GB 2259604	B			H01S-003/30	Based on patent WO 9216038
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Abstract (Basic): WO 9216038 A

The dye laser amplifier includes a dichroic mirror (1) through which a dye laser beam (2) passes via a polarising beam splitter (3), a quartz wave plate (4), lens (5) on its way to a stimulated brillouin scattering (SBS) dye cell (6). A pump laser beam (7) is incident on the mirror and is reflected with the dye laser beam into the SBS cell. The SBS dye cell includes a laser dye material e.g. Rhodamine 6G, Rhodamine B, Coumarin 523 dissolved in a SBS medium contained between two cell walls (9, 10). An amplifier dye laser beam is reflected off the beam splitter to form the output beam (11).

ADVANTAGE - Has improved bandwidth and beam uniformity. Allows cascading of amplifiers to provide very high degree of amplification.

Dwg.1/5

Title Terms: DYE; LASER; AMPLIFY; OPTICAL; COMMUNICATE; SYSTEM; STIMULATING; SCATTERING; DYE; CELL; RECEIVE; DYE; LASER; LIGHT; PUMP; BEAM; COMMON; OPTICAL; PATH

Index Terms/Additional Words: METHANOL; ACETONE; N-HEXANE; ISOPROPANOL; ETHANOL

Derwent Class: L03; P81; V07; V08

International Patent Class (Main): H01S-003/08; H01S-003/108; H01S-003/23; H01S-003/30

International Patent Class (Additional): G02F-001/35; H01S-003/213

File Segment: CPI; EPI; EngPI

14/5/6 (Item 6 from file: 350)

DIALOG(R)File 350:Derwent WPIX

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008688635

WPI Acc No: 1991-192655/199126

XRPX Acc No: N91-147487

**Transient energy self-pumped conjugate mirror - has probe and noise beams directed along equal time duration paths back into non-linear medium where they mix**

Patent Assignee: HUGHES AIRCRAFT CO (HUGA )

Number of Countries: 001 Number of Patents: 001

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
US 5023477	A	19910611	US 90473532	A	19900201	199126 B

November 5, 2002

Priority Applications (No Type Date): US 90473532 A 19900201

Abstract (Basic): US 5023477 A

Self-pumped phase conjugation is achieved for optical beams with short pulse durations by a transient energy transfer mechanism. A probe beam is transmitted through a non-linear optical medium, generating a noise beam from the medium. The probe and noise beams are directed along equal time duration paths, preferably contra-directional to each other, back into the non-linear medium where they mix with each other.

The peak probe pulse is thus mixed with the peak noise pulse to optimise gain. The thickness and optical coupling coefficient of the non-linear medium, and the angle between the returned probe and noise beams, are selected to produce a noise beam gain which is sufficient to generate a **phase conjugate** of the input **probe beam**.

ADVANTAGE - Self pumped operation is realised for previously unattainable short duration pulses. (8pp Dwg.No. 1/6

Title Terms: TRANSIENT; ENERGY; SELF; PUMP; CONJUGATE; MIRROR; PROBE; NOISE  
; BEAM; DIRECT; EQUAL; TIME; DURATION; PATH; BACK; NON; LINEAR; MEDIUM;  
MIX

Derwent Class: P81; V07

International Patent Class (Additional): G02B-006/32; H02J-003/02;

H03F-007/00; H04J-003/00

File Segment: EPI; EngPI

14/5/7 (Item 7 from file: 350)

DIALOG(R)File 350:Derwent WPIX

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008643989 \*\*Image available\*\*

WPI Acc No: 1991-148019/199120

XRFX Acc No: N91-113680

**Remote method of measuring sub-surface water temp. - using split laser beam causing Brillouin scattering to produce phase - conjugate beam propagating back along first beam**

Patent Assignee: GTE GOVERNMENT SYSTEMS CORP (SYLV )

Inventor: LEONARD D A; SWEENEY H E

Number of Countries: 001 Number of Patents: 001

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
US 5009500	A	19910423	US 89386382	A	19890728	199120 B

Priority Applications (No Type Date): US 89386382 A 19890728

Abstract (Basic): US 5009500 A

The technique for measuring the unknown subsurface temperature involves splitting a pulsed laser beam having a high intensity into two sub-beams, one of which is a probe beam directed into the medium. The intensity of the output beam pulses exceeds a predetermined threshold sufficient to cause stimulated Brillouin scattering within the medium and to produce therefrom a phase-conjugate beam which propagates along the path of the first sub-beam but in the opposite direction.

The second sub-beam combines with the PC beam and the combined beam mix at the cathode of a photodetector thereby producing a heterodyne frequency proportional to the temperature. Converts the heterodyne frequency into a temperature value yields the desired unknown temperature.

USE - Measuring bulk transparent medium e.g. ocean water. (6pp Dwg.No.1/2)

Title Terms: REMOTE; METHOD; MEASURE; SUB; SURFACE; WATER; TEMPERATURE;  
SPLIT; LASER; BEAM; CAUSE; BRILLOUIN; SCATTERING; PRODUCE; PHASE;  
CONJUGATE; BEAM; PROPAGATE; BACK; FIRST; BEAM

Derwent Class: S03

International Patent Class (Additional): G01B-009/02

File Segment: EPI



November 5, 2002

14/5/8 (Item 8 from file: 350)  
DIALOG(R)File 350:Derwent WPIX  
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008539189  
WPI Acc No: 1991-043252/199106  
Related WPI Acc No: 1992-174975  
XRPX Acc No: N91-033476

**Remote optical measurement of sub-surface water temp. - directing laser beam into sea and water at known temp. and mixing SBS beams for temp. proportional frequency**

Patent Assignee: GTE GOVERNMENT SYSTEMS CORP (SYLV )

Inventor: SWEENEY H E

Number of Countries: 001 Number of Patents: 001

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
US 4984903	A	19910115	US 89387734	A	19890801	199106 B

Priority Applications (No Type Date): US 89387734 A 19890801

Abstract (Basic): US 4984903 A

To remotely measure the unknown subsurface temp. Ts of a bulk transparent medium such as ocean water, a laser beam having a high power or intensity is split into two parts, a probe beam and a reference beam. The probe beam is directed into a sample of ocean water, and the reference beam into a reference sample of water having a known Tr.

The intensities of the two beams, which exceed a set threshold are sufficient to cause stimulated Brillouin scattering (SBS) within the two samples and produce from it two phase-conjugate beams. The two **phase conjugate beams** are mixed to **produce** a heterodyne frequency that is proportional to the difference in temp. Ts and Tr. The frequency difference is converted into a temp. value equal to the value of Ts.

USE - Remote measurement of properties of transparent media, such as subsurface ocean temp. profiles, partic. from surface or subsurface vessels or aircraft. (6pp Dwg.No.1/3

Title Terms: REMOTE; OPTICAL; MEASURE; SUB; SURFACE; WATER; TEMPERATURE; DIRECT; LASER; BEAM; SEA; WATER; TEMPERATURE; MIX; BEAM; TEMPERATURE; PROPORTION; FREQUENCY

Index Terms/Additional Words: STIMULATING; SCATTERING; HETERODYNE

Derwent Class: S03

International Patent Class (Additional): G01J-005/48; G01K-005/00;

G01K-013/00

File Segment: EPI

14/5/9 (Item 9 from file: 350)  
DIALOG(R)File 350:Derwent WPIX  
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008488481 \*\*Image available\*\*  
WPI Acc No: 1990-375481/199050  
XRPX Acc No: N90-286145

**Remote subsurface water temperature measuring appts. - simulates Brillouin scattering which produces heterodyne frequency proportional to temperature**

Patent Assignee: GTE GOVERNMENT SYSTEMS CORP (SYLV )

Inventor: LEONARD D A; SWEENEY H E

Number of Countries: 001 Number of Patents: 001

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
US 4973853	A	19901127	US 89386383	A	19890728	199050 B

November 5, 2002

Priority Applications (No Type Date): US 89386383 A 19890728

Abstract (Basic): US 4973853 A

A pulsed laser has a high intensity (power per unit area) output beam split into two sub-beams. One of which is a probe beam directed into the ocean water.

The intensity of the output beam pulses exceeds a predetermined threshold sufficient to cause stimulated Brillouin scattering within the medium and to **produce a phase - conjugate beam** which propagates along the path of the first sub-beam but in the opposite direction. The second sub-beam is reflected by a mirror to and combines with the PC beam and the combined beams are mixed at the cathode of a photodetector which produces a heterodyne frequency that is proportional to the temperature Ts. A frequency measuring instrument converts the heterodyne frequency into a temperature value equal to Ts.

ADVANTAGE - Compact and highly portable. (6pp Dwg.No.1/2

Title Terms: REMOTE; SUBSURFACE; WATER; TEMPERATURE; MEASURE; APPARATUS; SIMULATE; BRILLOUIN; SCATTERING; PRODUCE; HETERODYNE; FREQUENCY; PROPORTION; TEMPERATURE

Derwent Class: S03

International Patent Class (Additional): G01B-009/02; G01J-005/00; G01N-015/06

File Segment: EPI

14/5/10 (Item 10 from file: 350)

DIALOG(R)File 350:Derwent WPIX

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008418153 \*\*Image available\*\*

WPI Acc No: 1990-305154/199040

XRPX Acc No: N90-234514

**Phase conjugate mirror with Brillouin amplifier and 4 wave mixer - prods. by stimulated Brillouin scattering and 4 wave mixing, narrow bandwidth phase conjugated output free random phase jumps**

Patent Assignee: HUGHES AIRCRAFT CO (HUGA )

Inventor: LIND R C; PEPPER D M; ROCKWELL D A

Number of Countries: 015 Number of Patents: 007

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
WO 9010889	A	19900920				199040 B
US 4958908	A	19900925	US 89323649	A	19890315	199041
EP 416066	A	19910313	EP 90904503	A	19900222	199111
JP 3504902	W	19911024				199149
IL 93651	A	19930114	IL 93651	A	19900306	199305
EP 416066	B1	19940126	EP 90904503	A	19900222	199404
			WO 90US914	A	19900222	
DE 69006297	E	19940310	DE 606297	A	19900222	199411
			EP 90904503	A	19900222	
			WO 90US914	A	19900222	

Priority Applications (No Type Date): US 89323649 A 19890315

Cited Patents: 2.Jnl.Ref

Patent Details:

Patent No Kind Lan Pg Main IPC Filing Notes

WO 9010889 A

Designated States (National): JP

Designated States (Regional): AT BE CH DE DK ES FR GB IT LU NL SE

EP 416066 A

Designated States (Regional): DE FR GB IT NL

EP 416066 B1 E 17 G02F-001/35 Based on patent WO 9010889

Designated States (Regional): DE FR GB IT NL

DE 69006297 E G02F-001/35 Based on patent EP 416066

November 5, 2002

Based on patent WO 9010889

IL 93651            A            G02B-027/10

Abstract (Basic): WO 9010889 A

A phase conjugate mirror whose output beam is free from random phase jumps comprises a four wave mixer (88) and a Brillouin amplifier (86). An input beam (Ep) from a laser (82) is split into three components, two of which form reference beams (E1,E2), and is fed into the four wave mixer to **produce a phase conjugated beam** (Ec) in counter propagation to the input beam. The Brillouin amplifier amplifies this phase conjugated beam by transferring energy to it from the input beam to produce the output beam.

A beam director can tilt either of the reference beam slightly to steer the conjugate beam slightly relative to the input beam. The output beam may be modulated.

USE - In very narrow bandwidth high power laser radar system e.g. for missile guidance. (31pp Dwg.No.6/6

Title Terms: PHASE; CONJUGATE; MIRROR; BRILLOUIN; AMPLIFY; WAVE; MIX; PRODUCT; STIMULATING; BRILLOUIN; SCATTERING; WAVE; MIX; NARROW; BANDWIDTH ; PHASE; CONJUGATE; OUTPUT; FREE; RANDOM; PHASE; JUMP

Derwent Class: P81; V07; W06; W07

International Patent Class (Main): G02B-027/10; G02F-001/35

File Segment: EPI; EngPI

14/5/11            (Item 11 from file: 350)

DIALOG(R)File 350:Derwent WPIX

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007758403        \*\*Image available\*\*

WPI Acc No: 1989-023515/198903

XRPX Acc No: N89-018005

**Phased array combination of laser beams for e.g. defensive weapons - focusses multiple probe beams into single phase conjugation cell with overlapping focal volumes**

Patent Assignee: TRW INC (THOP )

Inventor: APRAHAMIA R; LINFORD G J; LOMBARDI G G; MARABELLA L J; MOYER R H; MUCH J

Number of Countries: 001    Number of Patents: 001

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
US 4794345	A	19881227	US 86832950	A	19860226	198903 B

Priority Applications (No Type Date): US 86832950 A 19860226

Patent Details:

Patent No	Kind	Lan Pg	Main IPC	Filing Notes
US 4794345	A	15		

Abstract (Basic): US 4794345 A

The apparatus includes a master laser oscillator for producing a reference laser beam, optical device for dividing the reference beam into a number of probe beams, and an equal number of laser amplifiers positioned to receive the respective probe beams. Each laser amplifier includes a laser gain region and optical device to provide multiple passes through the gain region, to generate near saturation flux in the probe beams. The apparatus also includes a single phase conjugation cell, and device for focusing the amplified **probe beams** into the **phase conjugation cell**.

Each conjugated probe beam is reflected from the base conjugation cell along an identical path to that of the probe beam. A discrimination device is associated with each of the probe beams, for discriminating between the probe beam and the corresponding reflected beam. The reflected beams emerging from the laser amplifiers are phase coherent with each other.

ADVANTAGE - Elimination of 'piston errors' and compensation for

November 5, 2002

other sources of aberration.

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Title Terms: PHASE; ARRAY; COMBINATION; LASER; BEAM; DEFENCE; WEAPON; FOCUS  
; MULTIPLE; PROBE; BEAM; SINGLE; PHASE; CONJUGATE; CELL; OVERLAP; FOCUS;  
VOLUME

Derwent Class: V08

International Patent Class (Additional): H01S-003/23

File Segment: EPI

14/5/12 (Item 12 from file: 350)

DIALOG(R)File 350:Derwent WPIX

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007533586 \*\*Image available\*\*

WPI Acc No: 1988-167518/198824

XRPX Acc No: N88-127979

**Producing gradient intensity image from transparent phase object -  
directing collimated coherent beam to real-time photorefractive  
holographic crystal for producing phase conjugate beam of object**

Patent Assignee: US SEC OF ARMY (USSA )

Inventor: BRODY P S; LEAVITT R P

Number of Countries: 001 Number of Patents: 001

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
US 4721362	A	19880126	US 85739749	A	19850531	198824 B

Priority Applications (No Type Date): US 85739749 A 19850531

Patent Details:

Patent No	Kind	Lan Pg	Main IPC	Filing Notes
US 4721362	A	11		

Abstract (Basic): US 4721362 A

A shutter disposed in the path of an expanded laser beam is opened, and the beam is split into two. The first beam is directed through the transparent phase object and focused into a photorefractive hologram recording crystal for the write time of the crystal. The shutter is closed, and the position of the transparent phase object is shifted an incremental amount.

The shutter is opened again so that the first beam is directed through the shifted transparent phase object and into the photorefractive hologram recording crystal such that a **phase - conjugate beam** is **produced** in the opposite direction of the first beam. The phase-conjugate beam is collimated, directed through the shifted transparent phase object, and split into two. One of these beams is directed into the objective of a microscope to form an intensity image of the transparent phase object.

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Title Terms: PRODUCE; GRADIENT; INTENSITY; IMAGE; TRANSPARENT; PHASE;  
OBJECT; DIRECT; COLLIMATE; COHERE; BEAM; REAL-TIME; HOLOGRAM; CRYSTAL;  
PRODUCE; PHASE; CONJUGATE; BEAM; OBJECT

Index Terms/Additional Words: PRODUCE; GR

Derwent Class: P81; P84; S03; V07

International Patent Class (Additional): G02B-021/06; G02B-027/00;  
G03H-001/02

File Segment: EPI; EngPI

14/5/13 (Item 13 from file: 350)

DIALOG(R)File 350:Derwent WPIX

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007267175

WPI Acc No: 1987-264182/198737

XRPX Acc No: N87-197841

November 5, 2002

**Photorefractive crystal self-pumped phase conjugate mirror - has  
alternating electric field applied to crystal and probe optical beam  
reflected back through it**

Patent Assignee: HUGHES AIRCRAFT CO (HUGA )  
Inventor: KLEIN M B; VALLEY G C; KKLEIN M B  
Number of Countries: 015 Number of Patents: 010  
Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
WO 8705406	A	19870911	WO 87US114	A	19870127	198737 B
NO 8704585	A	19871221				198805
EP 259374	A	19880316	EP 87901192	A	19870127	198811
US 4773739	A	19880927	US 86836679	A	19860305	198841
JP 63502622	W	19880929	JP 87501225	A	19870127	198845
ES 2002983	A	19881001	ES 87587	A	19870304	198929
EP 259374	B	19910904				199136
DE 3772675	G	19911010				199142
IL 81500	A	19920115				199209
NO 173077	B	19930712	WO 87US114	A	19870127	199333
			NO 874585	A	19871103	

Priority Applications (No Type Date): US 86836679 A 19860305

Cited Patents: 9.Jnl.Ref

Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
WO 8705406	A	E	21		
				Designated States (National):	JP KR NO
				Designated States (Regional):	BE CH DE FR GB IT NL SE
EP 259374	A	E			
				Designated States (Regional):	BE CH DE FR GB IT LI NL SE
US 4773739	A		8		
EP 259374	B				
				Designated States (Regional):	BE CH DE FR GB IT LI NL SE
NO 173077	B			G02F-001/35	patent NO 8704585

Abstract (Basic): WO 8705406 A

A crystal (16) of photorefractive material has an alternating voltage source (8) connected between opposed electrodes (14,16). This produces a photorefractive index grating shift in the crystal of about 90 deg.

A laser probe beam (20) is directed through the crystal and reflected back (30) through it by a pair of mirrors (26,28) to intersect the input beam (22) within the crystal at an angle (A). The angle is sufficiently small to permit cross coupling and production of a phase conjugate (32) of the input beam substantially retro reflective to the latter.

ADVANTAGE - Permits use of materials of lower electro optic coeffs. than formerly, some of which are more readily available have a shorter response time, and greater sensitivity over commercially important wavelength regions e.g. 0.7-11 microns.

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Title Terms: CRYSTAL; SELF; PUMP; PHASE; CONJUGATE; MIRROR; ALTERNATE;  
ELECTRIC; FIELD; APPLY; CRYSTAL; PROBE; OPTICAL; BEAM; REFLECT; BACK;  
THROUGH

Derwent Class: P81; P84; V07

International Patent Class (Main): G02F-001/35

International Patent Class (Additional): G02B-005/23; G03H-001/02;

H01S-003/10

File Segment: EPI; EngPI

14/5/14 (Item 14 from file: 350)

DIALOG(R)File 350:Derwent WPIX

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007122833

November 5, 2002

WPI Acc No: 1987-122830/198717

XRPX Acc No: N87-091996

**Holographic memory for logical operations and pattern recognition - uses phase conjugate mirrors and single hologram to store pairs of information patterns**

Patent Assignee: HUGHES AIRCRAFT CO (HUGA )

Inventor: DUNNING G; KLEIN M; MAROM E; OWECHKO Y; PEPPER D; SOFFER B

Number of Countries: 011 Number of Patents: 007

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
WO 8702505	A	19870423	WO 86US2033	A	19860926	198717 B
EP 243492	A	19871104	EP 86900360	A	19860926	198744
US 4739496	A	19880419	US 85786884	A	19851011	198818
JP 63501751	W	19880714	JP 86500130	A	19860926	198834
EP 243492	B	19900808				199032
DE 3673404	G	19900913				199038
IL 79991	A	19901129				199105

Priority Applications (No Type Date): US 85786884 A 19851011

Cited Patents: 1.Jnl.Ref; No-SR.Pub; US 3600054

Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
WO 8702505	A	E	31		
Designated States (National): JP					
Designated States (Regional): CH DE FR GB IT LI NL SE					
EP 243492	A	E			
Designated States (Regional): CH DE FR GB IT LI NL SE					
US 4739496	A		9		
EP 243492	B				
Designated States (Regional): CH DE FR GB IT LI NL SE					

Abstract (Basic): WO 8702505 A

The appts. (10) uses a hologram (12) and two phase conjugate mirrors (14,16) arranged to form a resonator. The output image (44) from the appts., converges to that closely associated with an input image (32). Alternatively the appts. includes a multiple storage and erasure hologram using only a single conjugate mirror (14).

A light path conveys the probe reference beam provided by the hologram, to the conjugate mirror and conveys back to the hologram a **phase conjugated probe reference beam** as formed by the phase conjugate mirror.

ADVANTAGE - Rapid convergence to desired image, uses one hologram.  
1/3

Title Terms: HOLOGRAM; MEMORY; LOGIC; OPERATE; PATTERN; RECOGNISE; PHASE; CONJUGATE; MIRROR; SINGLE; HOLOGRAM; STORAGE; PAIR; INFORMATION; PATTERN

Derwent Class: P84; T01; T02; T04; U14; V07

International Patent Class (Additional): G03H-001/02; G11C-013/04;

G11C-015/00

File Segment: EPI; EngPI

14/5/15 (Item 15 from file: 350)

DIALOG(R)File 350:Derwent WPIX

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004362694

WPI Acc No: 1985-189572/198531

XRPX Acc No: N85-142356

**Passive phase conjugate mirror - uses single incident beam and third order non-linear polarisation medium for producing phase conjugate beam**

Patent Assignee: CALIFORNIA INST OF TECHN (CALY )

Inventor: FISCHER B; GOLOMB M C; WHITE J O; YARIV A

Number of Countries: 001 Number of Patents: 001

Patent Family:

November 5, 2002

Patent No	Kind	Date	Applicat No	Kind	Date	Week
US 4529273	A	19850716	US 82451849	A	19821221	198531 B

Priority Applications (No Type Date): US 82451849 A 19821221

Patent Details:

Patent No	Kind	Lan Pg	Main IPC	Filing Notes
US 4529273	A	8		

Abstract (Basic): US 4529273 A

The appts. comprises a third-order nonlinear polarisation medium and a passive optical system, comprising one or more ordinary mirrors so arranged relative to the medium to reflect back through the medium a coherent incident beam diffracted by the medium. Two mirrors are aligned to form a linear optical cavity containing the medium. The input beam is positioned so that it enters the medium on one side with the medium oriented so that light in the cavity experiences gain via nonlinear optical coupling in the medium.

The beams of light thereby generated in the cavity between the aligned mirrors act as pumping beam for the medium, which then acts as a four-wave mixing PCM for the input beam. This provides coherence of the pumping beams with the input (signal) beam.

USE - For end mirror in laser resonator for correction of interactivity phase distortion.

3b/10

Title Terms: PASSIVE; PHASE; CONJUGATE; MIRROR; SINGLE; INCIDENT; BEAM; THIRD; ORDER; NON; LINEAR; POLARISE; MEDIUM; PRODUCE; PHASE; CONJUGATE; BEAM

Derwent Class: P81; V08

International Patent Class (Additional): G02B-005/08; G02F-001/01

File Segment: EPI; EngPI

14/5/16 (Item 16 from file: 350)

DIALOG(R)File 350:Derwent WPIX

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004217091

WPI Acc No: 1985-043971/198507

XRPX Acc No: N85-032767

**Photolithography apparatus with phase conjugate optics - using emitter to produce beam of coherent electromagnetic radiation which is separated into ower and imaging beams by splitter**

Patent Assignee: TEXAS INSTR INC (TEXI )

Inventor: SHAH R R

Number of Countries: 001 Number of Patents: 001

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
US 4496222	A	19850129	US 84605984	A	19840501	198507 B

Priority Applications (No Type Date): US 84605984 A 19840501; US 81332384 A 19811221

Patent Details:

Patent No	Kind	Lan Pg	Main IPC	Filing Notes
US 4496222	A	13		

Abstract (Basic): US 4496222 A

A mask incident to the imaging beam with an original image formed on it, amplitude modulates the beam to form an imaged beam. A converger incident to the power beam produces a converging power beam. A diverger incident to the converging power beam produces a diverging power beam being collinear and coextensive with the converging power beam.

A nonlinear medium lies incident to the converging and diverging power beams and the imaged beam to produce a phase conjugated beam. A target object having its surface disposed incident to the phase conjugated beam produces a reduced image.

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USE/ADVANTAGE - For semiconductor manufacture. Image system is free from speckle effects and has finer line widths.

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Title Terms: PHOTOLITHOGRAPHIC; APPARATUS; PHASE; CONJUGATE; OPTICAL; EMITTER; PRODUCE; BEAM; COHERE; ELECTROMAGNET; RADIATE; SEPARATE; OWE; IMAGE; BEAM; SPLIT

Index Terms/Additional Words: SEMICONDUCTOR

Derwent Class: P81; U11

International Patent Class (Additional): G02F-001/35

File Segment: EPI; EngPI

14/5/17 (Item 17 from file: 350)

DIALOG(R)File 350:Derwent WPIX

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004079951

WPI Acc No: 1984-225492/198436

XRPX Acc No: N84-168472

**Degenerate four-wave mixer - has multiple quantum well traversed by two or three overlapping input beams from low power diode laser sources**

Patent Assignee: AMERICAN TELEPHONE & TELEGRAPH CO (AMTT ); AT & T BELL LAB (AMTT )

Inventor: CHEMLA D S; MILLER D A; SMITH P W

Number of Countries: 007 Number of Patents: 007

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
WO 8403364	A	19840830	WO 84US250	A	19840223	198436 B
EP 137033	A	19850417	EP 84901164	A	19840223	198516
JP 60500832	W	19850530	JP 84501144	A	19840223	198528
US 4528464	A	19850709	US 83470319	A	19830228	198530
CA 1239462	A	19880719				198834
EP 137033	B	19920108				199203
DE 3485430	G	19920220				199209

Priority Applications (No Type Date): US 83470319 A 19830228

Cited Patents: 2.Jnl.Ref; SSR870114; US 3746879; US 3988593

Patent Details:

Patent No	Kind	Lan Pg	Main IPC	Filing Notes
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WO 8403364	A	E 68		
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Designated States (National): JP

Designated States (Regional): DE FR GB NL

EP 137033	A	E		
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Designated States (Regional): DE FR GB NL

EP 137033	B			
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Designated States (Regional): DE FR GB NL

Abstract (Basic): WO 8403364 A

A multiple quantum well, MQW (516) of nonlinear optical material is traversed by forward and backward pump input beams (508,520) produced by a laser (502) and a mirror. A probe input beam (524) derived by a mirror (522) from the beam (508) overlaps both pump beams in the MQW. The beam interactions produce at least one output phase conjugate beam e.g. forward beam (530) and backward beam (532). Opt. only two input beams are used.

Pref the MQW carrier layer e.g. GaAs and barrier layer e.g. AlxGal-x as with x sufficiently large to provided confinement; or carrier AlxGal-x as with x sufficiently small to provide direct band gap transition; or carrier and barrier both from Inx-x-y Gax Aly As; or from Gax In1-x Py As1-y.

USE/ADVANTAGE - In optical fibre communications. Is operable with low intensity diode lasers. The MQW and lasers can be integrated on the same substrate.

Title Terms: DEGENERATE; FOUR; WAVE; MIX; MULTIPLE; QUANTUM; WELL; TRAVERSE ; TWO; THREE; OVERLAP; INPUT; BEAM; LOW; POWER; DIODE; LASER; SOURCE



November 5, 2002

Derwent Class: P81; U13; V07; W02  
International Patent Class (Additional): G02F-001/35; G02F-002/00;  
H01S-003/18; H03F-007/00  
File Segment: EPI; EngPI

14/5/18 (Item 18 from file: 350)  
DIALOG(R)File 350:Derwent WPIX  
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003355870

WPI Acc No: 1982-L3893E/198234

**Self-regenerative laser oscillator-amplifier assembly - generates single mode laser beam and probe beam which interact in non-linear medium to produce phase conjugated beam**

Patent Assignee: HUGHES AIRCRAFT CO (HUGA )

Inventor: HON D T

Number of Countries: 001 Number of Patents: 001

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
US 4344042	A	19820810				198234 B

Priority Applications (No Type Date): US 80126592 A 19800303

Patent Details:

Patent No	Kind	Lan Pg	Main IPC	Filing Notes
US 4344042	A	7		

Abstract (Basic): US 4344042 A

The laser oscillator-amplifier system includes a laser oscillator for providing light along a first optical path, and a laser amplifier for amplifying light along a second optical path. A beam splitter for coupling light between the first and second optical paths is disposed at one end of the laser amplifier, and a nonlinear medium is disposed at the other end of the amplifier for intercepting light provided along the first and second optical paths. The laser oscillator provides a single-mode laser beam along the first optical path which is made incident upon the nonlinear medium from opposite directions.

A portion of the beam from the laser oscillator is coupled through the laser amplifier, which forms a probe beam that samples the laser amplifier system. This beam further impinges upon the nonlinear medium and interacts with the counter-propagating laser beams in the medium. A phase-conjugated beam is reflected from the nonlinear medium and is amplified by the amplifying medium providing a single-mode output beam of the laser amplifier system.

1/5

Title Terms: SELF; REGENERATE; LASER; OSCILLATOR; AMPLIFY; ASSEMBLE;  
GENERATE; SINGLE; MODE; LASER; BEAM; PROBE; BEAM; INTERACT; NON; LINEAR;  
MEDIUM; PRODUCE; PHASE; CONJUGATE; BEAM

Derwent Class: V08

International Patent Class (Additional): H01S-003/09

File Segment: EPI

14/5/19 (Item 19 from file: 350)  
DIALOG(R)File 350:Derwent WPIX  
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002376380

WPI Acc No: 1980-J2846C/198038

**Adaptive correction of linear phase aberrations - in laser amplifier systems by using gain saturation in degenerate four-wave mixing process to produce conjugate image beam**

Patent Assignee: BELL TELEPHONE LAB INC (AMTT )

Inventor: BLOOM D M; LIAO P F

Number of Countries: 001 Number of Patents: 001

November 5, 2002

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
US 4220928	A	19800902				198038 B

Priority Applications (No Type Date): US 78908773 A 19780523

Abstract (Basic): US 4220928 A

Linear phase aberrations in laser amplifier systems are adaptively corrected by propagating an object beam formed by reflection of a laser beam from a target backwards through a laser amplifier chain in order to sample the linear **phase** aberrations. A **conjugate** image **beam** is **prod** . by degenerate four-wave mixing in a medium having a third order nonlinearity in susceptibility. The conjugate image beam which is amplified as it propagates back through the laser amplifier chain has the linear phase aberrations removed.

Birefringent aberrations contained in the laser amplifier chain are also corrected when (1) the medium has an isotropic nonlinearity; (2) the polarisation of the pump beams, reqd. for four-wave mixing, lies in the plane formed by the object beam and the pump beams; and (3) the angle between the object beams and the pump beams is 90 degrees. The degenerate four-wave mixing is accomplished in one form by gain saturation in Nd:YAG

Title Terms: ADAPT; CORRECT; LINEAR; PHASE; ABERRATION; LASER; AMPLIFY; SYSTEM; GAIN; SATURATE; DEGENERATE; FOUR; WAVE; MIX; PROCESS; PRODUCE; CONJUGATE; IMAGE; BEAM

Derwent Class: V08

International Patent Class (Additional): H01S-003/10

File Segment: EPI